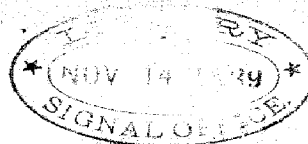


Jamaica Meteorological Office



J A M A I C A. weather report. 3

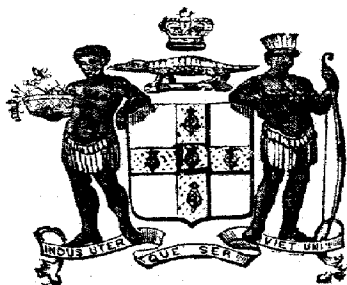
(METEOROLOGICAL OBSERVATIONS.)

VOL. I.

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FROM

JUNE, 1881, TO DECEMBER, 1888, INCLUSIVE.



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INTRODUCTION.

In his opening speech to the Legislative Council early in January, 1878, the late Sir Anthony Musgrave referred to the necessity of Telegraphic communication through the Island of Jamaica; and as it had long been my wish to utilize the work carried on at the Kempshot Observatory near Montego Bay, on July 12th, 1878, I wrote a letter to the Government pointing out that from its geographical position Jamaica was well situated for a Central Observatory for the West Indies, and that the Observatory might easily be maintained by the different Islands and Countries which would derive benefit from the institution.

In that letter it was proposed to connect Kempshot with Montego Bay by telegraph, and so to place the Observatory in communication with the rest of Jamaica, with the other West Indian Islands, and with the United States; and the practical part of the work proposed was to give Time-signals and to issue Storm-warnings.

To that letter a favourable reply was sent me, asking for further particulars, and stating that if the plan appeared workable His Excellency would place himself in communication with the other Colonies, either directly, or through the Astronomer Royal and the Secretary of State for the Colonies.

My reply was briefly to the effect that a commencement on a small scale might be effected as proposed at first, and that as I was about to return to England for a short time for the benefit of my health it would be advantageous for me to have the opinion of Sir George Airy, the Astronomer Royal at that time.

In passing through Kingston I had an interview with the Hon. E. N. Walker, Assistant Colonial Secretary, who informed me that the subject under discussion would be mentioned in the Despatches to the Secretary of State for the Colonies.

Accordingly when in London that autumn I had an interview with Sir George Airy, who, however, strongly recommended the establishment, in the first instance, of a large Observatory near Kingston; and upon his reporting favourably to the British Government, I drew up a scheme and submitted it to Sir Michael Hicks Beach, Her Majesty's Principal Secretary of State for the Colonies, in a communication dated October 11th, 1878; but obviously it was rather a sketch than a settled plan. On November 20th, I had an interview with Sir Michael Hicks Beach, who expressed himself generally that there could be no doubt that the system would be highly beneficial if it could be carried out. At "Lloyds," in London, I had an interview with the Chairman and Secretary, and they so highly approved of my endeavour that "Lloyds" wrote forthwith to the Government on the subject.

The whole matter was then referred to the Meteorological Council of the Royal Society for their approval from a scientific point of view; and I returned to Jamaica, arriving early in January, 1879. A small house called "Waireka," with a few acres of land attached, on the top of the Long Mountains, which overlook Kingston Harbour and Port Royal, was considered to be the best site for the Observatory near Kingston.

The Report of the Meteorological Council was dated February 1st, 1879, and a copy reached me in April that year. It was to the effect that as Astronomical work had no connection with Meteorological work, they could not recommend it as part of the scheme; that the West Indian Observatory should be at Antigua and not in Jamaica; and that only the British Colonies should be asked to co-operate.

Returning to England by the next mail I found that neither the Government nor the Council of the Royal Society would again discuss the matter: and what correspondence there was seemed highly unsatisfactory.

Proposals in accordance with the Report were submitted, I believe, to the British West Indian Islands; but the proposals were not accepted.

When in Washington early in April, 1880, I had an interview with General Myer, the Chief Signal Officer of the U. S. Army, and with his support and advice I determined to make another attempt; and establishing myself in Kingston, Jamaica, I commenced reading the instruments June 1st, 1880, at intervals of 8 hours, namely at 7 a.m., 3 p.m. and 11 p.m., Washington mean time, which also happens to be Kingston mean time, as both places are nearly on the same meridian.

The ensuing months were occupied with attempts to arrange a West Indian System based upon the stations established by the U. S. Signal Service; and the Cyclone, or rather Cyclones, which whirled over Jamaica on the night of August 18th, 1880, showed as clearly as possible the advantages to be gained from a fixed and definite system of Storm-warnings.

The death of General Myer was announced a few days after the passage of the Jamaica Cyclones.

In September the Government of Jamaica informed me that the Secretary of State for the Colonies had authorized them to place on the estimates for the coming financial year the sum of £150 towards the maintenance of the proposed central station in Jamaica, and requested me to state shortly and specifically, before the vote was submitted to the Legislative Council, what information I proposed to give the public and in what manner.

My reply was that I hoped to be able to establish a satisfactory system for Jamaica, and on October 29th, 1880, the following details were submitted for approval:—

(1.) The usual Meteorological instruments are to be kept in Kingston or its immediate neighbourhood, and their readings properly recorded in a register.

(2.) Weather Reports, or copies of the more important parts of this register, are to be sent day by day to any newspaper which may offer to publish them, and monthly abstracts are to be sent to the Colonial Secretary for publication in the *Jamaica Gazette*.

(3.) The registration of rain gauges throughout Jamaica is to be encouraged by the monthly publication, as the Government may direct, of the rainfall returns sent in to the Meteorologist in charge at Kingston.

(4.) With co-operation of the P. O. Telegraph Department, daily Weather Reports of a simple description are to be regularly transmitted to Kingston at 8 p.m. from a few Telegraph Stations at carefully selected out-ports or towns; after these Reports have been examined, they are to be sent for publication together with the Kingston daily Weather Reports.

(5.) When the weather is disturbed the Meteorologist in charge at Kingston may call in Weather Reports from these stations at any hour they may be open, in order to assist him in determining the nature of the disturbance.

(6.) When the instruments at Kingston give sure and certain indications of coming storm, or when they merely confirm reliable warnings received by Telegraph, notice must be posted in Kingston as soon as possible, and then telegraphed round the Island. Under other circumstances the Meteorologist in charge must use his own discretion.

(7.) Such notices of storms are to be posted in a place in Kingston previously selected for that purpose; they are to be signed by the Meteorologist in charge: and the cautionary flag is to be hoisted outside the building in which such notices are posted, in order to attract public attention to them.

(8.) An Annual Report is to be sent to the Colonial Secretary for publication in the *Jamaica Gazette*; it is to include the meteorological observations made in Kingston, and any special reports or appendices which may be considered proper or necessary.

This proposed service was approved of by the Government, the vote was passed, and from that time up to the present an annual subsidy of £150 has been paid in regular monthly instalments towards the maintenance of the Weather Service.

The Government then instructed me to send monthly abstracts of the Kingston register to the *Gazette*, as well as the rainfall returns; so that Monthly Reports appeared in the *Gazette*; and in June 1881, these Reports were published separately by merely utilizing the type set up for the *Gazette*, and they were distributed to all the rainfall contributors, and to various scientific bodies in Europe and America.

There are now 101 of these Reports which have been issued between June, 1881, and December, 1888; and for their preservation, as well as for the convenience of reference, it is necessary that they should be bound into a volume. For this purpose an Index and Title-page will be issued with this Introduction, so that those who have filed the Reports from month to month may be able to have them bound into a single volume.

Having explained how these Reports came into existence, it still remains for us to say a few words in continuation.

In July, 1880, Mr Robert Johnstone, a clerk in the Colonial Secretary's Office, relieved me of the work of reading and recording the instruments; and for these services, which were not found to interfere with his official duties, he received from me the small remuneration of £50 per annum. And since that time Mr. Johnstone has read the instruments in Kingston carefully and conscientiously, so that the Kingston Register contains an ample store of most valuable observations from which it is expected that several important conclusions will be drawn. It is a pity that this register has not been published in Annual Reports as originally intended; but the Monthly Reports seemed to remove their necessity; and it is needless to say that the scope of publication is somewhat restricted.

The instruments used are of a good description: the mercurial barometers were examined at Kew, and their errors ascertained; all the thermometers used are divided on their stems, and they are compared from time to time with a superior thermometer, whose errors were ascertained at Kew for every 10°, the error in no case exceeding one-tenth of a degree between 30° and 100°; and the thermometers are exposed in Stevenson's screens, placed on grass lawns. A self-registering aneroid was procured with the idea of ascertaining the diurnal variation of the barometer; but it was found that the instrument was not sufficiently sensitive; and a self-registering Osler anemometer was attached to the roof of the Colonial Secretary's Office. The instruments cost me over £160; some were placed at the Colonial Secretary's Office, others at Mr. Johnstone's residence, and a few were sent to Kempshot.

Communication was established between Jamaica and the other West Indian stations of the U. S. Signal Service for the hurricane season of 1881; but the arrangements in Jamaica for local weather reports of a simple description proved highly unsatisfactory. Now in order to enable Kingston to issue warnings in advance of a storm it is necessary that the Kingston barometer should be compared with others in the Island: and to overcome this difficulty it became necessary for me to return to Kempshot, leaving Mr. Johnstone in charge of the instruments in Kingston, and to base the service upon accurate observations at Kempshot and Kingston. Subsequent events showed that this move was in the right direction; but unfortunately the original idea of connecting Kempshot with Montego Bay by Telegraph has never been carried out; and there is great anxiety and loss of time in consequence of this break in the communication between the two places.

About this time a station was established at the Government Cinchona Plantation on the Blue Mountain Range, about 4,900 feet above the sea-level, and only 13 miles from Kingston. Mr. D. Morris, who was then the Director of Public Gardens and Plantations, procured instruments similar to those in use in Kingston, and commenced to read them in October, 1881. This service has been maintained up to the present time by the Directors and their staff; and the comparison of the Kingston and the Cinchona Plantation observations cannot fail to be both interesting and important.

In 1883 occurred the disestablishment by Congress of all the West Indian Stations maintained by the Signal Service. They had paid me £120 a year as an ordinary observer since June, 1880: this aid was withdrawn in June, 1883; and all hopes of co-operation and centralization were at an end. In his *Annual Report* for 1883 the Chief Signal Officer wrote as follows:—"A request was made for \$4,000 to

pay for these warnings of tropical hurricanes, which last year were instrumental in saving millions of dollars of property. Two storms of great fury swept up from the Gulf, one in September and one in October,* warnings of the coming of these storms were given from the West Indian Stations, so that the indications officer on duty in each month was able to give at least two days' notice of the coming of the storm to every port in the Gulf and on the Atlantic coast. The result was an immense saving of valuable property and of human life."

The sequence of events still proved unfavourable to the undertaking: a great wave of commercial depression was about to pass over the West Indies, which induced me to seek and obtain other employment under the Government; but although such further work rendered the Weather Service a matter of secondary consideration, yet it has clearly had the effect of keeping the Service in existence.

As a result of all these circumstances it will be found that the Reports refer to local arrangements and observations; a glance at the Index will show that it is impossible to give an account of all the work which has been done in Jamaica; but the following brief notes on some of the more important subjects may be interesting.

The rainfall registers kept at 61 stations from about 1870 to the end of 1879 were carefully reduced and published in Reports, Nos. 31 and 33; many important conclusions were drawn which await confirmation at the close of the present decennial period. Between 1880 and the present year, 1889, about 150 rain-gauges have been regularly registered; and after their reduction, at the end of this year, it will be possible to construct maps of the rainfall over the Island, showing the average rainfall over each locality for each month of the year as deduced from observations extending over 20 years.

In 1883 a series of experiments were made with the view of ascertaining the degree of accuracy which could be secured in Forecast of the daily weather with respect to rain from observations made at one place. In Report No. 34 the following results were obtained at Kempshot for October:—

Verified	...	...	21
Partly Verified	...	...	3
Not Verified	...	...	1
Total			25

This high degree of accuracy is partly attributable to the use of the spectroscope. Besides the usual vapour-bands in the Red, we have in Jamaica a very strong band in the Blue,† which Professor Piazzzi Smyth, in his work on the Solar Spectrum,‡ has termed the "Jamaica Rainband"; and there can be no doubt whatever that the spectroscope is a most valuable instrument for such purposes in the Tropics at least.

In 1884 and 1885 a series of experiments were made in order to ascertain the degree of accuracy which could be secured in forecasts of the Monthly Rainfall. At the commencement of each month the probable Rainfall for that month was computed and published, with the following results:—

In 1884, Verified	6	not Verified	2
In 1885, " "	10	" "	2
16			4

So that out of 20 monthly forecast, 16, or 80 per cent., were verified.—(Report No. 61.)

Two Reports on Earthquakes will be found, dealing chiefly with the effects of shocks on the barometer, the wind, and the clouds; these effects are both previous and subsequent to the shocks; but the previous effect upon the wind has been continually noticed in Jamaica for 200 years prior to the erection of the self-registering anemometer.

Some very delicate observations were made at the Observatory, showing a connection between the number of Solar spots and the intensity of the Solar radiation; but they required so much time and care that they were discontinued until more favourable circumstances should permit me to work out this fundamental problem.

Reference has been made to the Cyclones of August 18th, 1880, which therefore occurred before the establishment of the Weather Service; the accounts received at first from all parts of the Island were so complicated and conflicting, that instead of writing a Report at once, almost a year was occupied in calling in detailed reports from reliable sources, which were then arranged and put aside so that the Report might be connected with the Introduction and placed at the commencement of the Volume of Observations: and accordingly a concise account of those Cyclones is here given. The greater part of the information collected has been condensed in the engraving which accompanies this account, so that it is only necessary to write a few lines in explanation, and to attach the more important parts of those reports and thereby place them on record.

THE JAMAICA CYCLONES, AUGUST 18TH, 1880.

As the steamer "Nith" was passing the south point of Guadaloupe, August 15th, 1880, on her voyage from England to Jamaica, she experienced bad weather due to a disturbance somewhere to the south-east of her; and according to the information published in the *St. Thomas Tidende* (see Note 1) two depressions must have passed the Windward Islands on the afternoon of the 16th:—one between Guadaloupe and Dominica, and the other between Martinique and St. Lucia; and of course the weather got gradually worse as the "Nith" continued her voyage, pursued by these depressions.

The first overtook and passed her on the morning of the 17th; but the weather had not time to im-

* See Jamaica Weather Reports, Nos. 18 and 19. † Wave-number 50,385. ‡ The Visual Solar Spectrum in 1834.

prove before the second came up. This was a serious Cyclone; and at noon August 18th, in lat. 16° 27' N. and long. 74° 57' W. the "Nith" had to stop, face the wind and sea, and allow the Cyclone to pass. Extracts from the log of the "Nith" will be found in Note 2.

Now on the evening of August 17th, the schooner "Lord Warden" left Port Morant in Jamaica for the Windward Passage, and on the morning of the 18th the schooner encountered a small Cyclone about 25 miles to the east of the Morant Point Light-house; the Cyclone passed south of the schooner on a north-west course, and was west of her at noon. Extracts from the log of the "Lord Warden" will be found in Note 3.

We would have no hesitation in saying that this small Cyclone was the first one which passed the "Nith" on her voyage from the Windward Islands if it were not for the circumstance that another small Cyclone passed along the south coast of Hayti on the afternoon of the 18th. The S.S. "Atlas" was taking in cargo at Aux Cayes, when a squall set in from the N.E. and the barometer began to fall rapidly; Captain Pearce determined to put to sea, and at about 4 p.m. the "Atlas" left Aux Cayes and steered in the direction of Jacmel. At this hour the wind was blowing a gale from E.S.E., having veered from N.E. round by E., and the barometer (corrected to the Kingston standard) was 29.08. The gale soon abated, and fair weather was found at Jacmel.

Consequently this Cyclone must have passed south of Aux Cayes at about 3 p.m.; and the great fall in the barometer clearly shows that this storm at Aux Cayes, which deluged the town with rain, was not due to the Cyclone which passed the "Nith" about noon; and all that can be said is that either this Cyclone or the one encountered by the "Lord Warden" was the Cyclone which first passed the "Nith".

Nothing further is known respecting the progress of the Aux Cayes Cyclone: the Royal Mail S.S. "Nile" arrived at Port-au-Prince at 2 p.m. and remained there until the morning of the 19th; the wind was E.S.E. at Port-au-Prince that night, so that the Cyclone could not have passed North through the windward passage and neither could it have passed Westward to Jamaica according to the following account of what occurred in Jamaica.

NOON.

In the small drawing showing the direction and force of the wind at various places at noon, August 18th, the large Cyclone south-west of the "Nith" is marked A to distinguish it from the Cyclone B, which was west of the "Lord Warden". The schooners "Pet" and "Avis" were at anchor at the Pedro Bank; the weather there during the night will be found in Note 4; and the direction of the wind at the Bank assures us that the Cyclone A must have curved north-wards on its course, as shown in the drawing. The N. by E. arrow refers to Spring Garden in Portland, and the N.E. arrow refers to Manchioneal. The readings of the barometer at Kingston, Santiago de Cuba, Port-au-Prince, and on board the "Nith" are also given.

4 P.M.

At this time we see in the next drawing that A had advanced on its curved course at the rate of 18 miles an hour, or 15½ knots an hour, which is a little less than its average speed of 19 knots an hour from the Windward Islands. We also see that B had advanced inland very slowly, and that the winds at the east end of Jamaica had changed accordingly; and that the barometer on board the "Atlas" was lower than even that at Kingston, and much lower than that on board the "Nith" where it had risen since noon. The N. arrow refers to Newcastle; the S.E. arrow refers to Port Antonio. It unfortunately happens that the time of the change from N.E. to S.E. at Manchioneal is not on record; it seems probable that it changed about 3 p.m.; but as the Cyclone A came up the wind blew still harder from the S.E., and the S.E. gale, or hurricane, is alluded to after 6 p.m. What information there is from Manchioneal will be found in note 5.

As already said we have taken the wind at this end of the Island from Port Antonio; the S.S. "Tropic" was in harbour there, and Captain King has given us a valuable record of the weather (note 6); his aneroid bar. fell rapidly from noon to 4 p.m. when it remained steady or nearly so until mid-night; but there can be no doubt that the mechanism of the instrument was out of adjustment so that the true fall of pressure was unduly magnified; no attempt has therefore been made to correct the readings, which in the morning were too high, but which in the afternoon were too low.

At Spring Garden the wind was E. at 5 p.m. and therefore probably E.N.E. at 4 p.m., which is quite in accordance with the wind at Port Antonio and Newcastle.

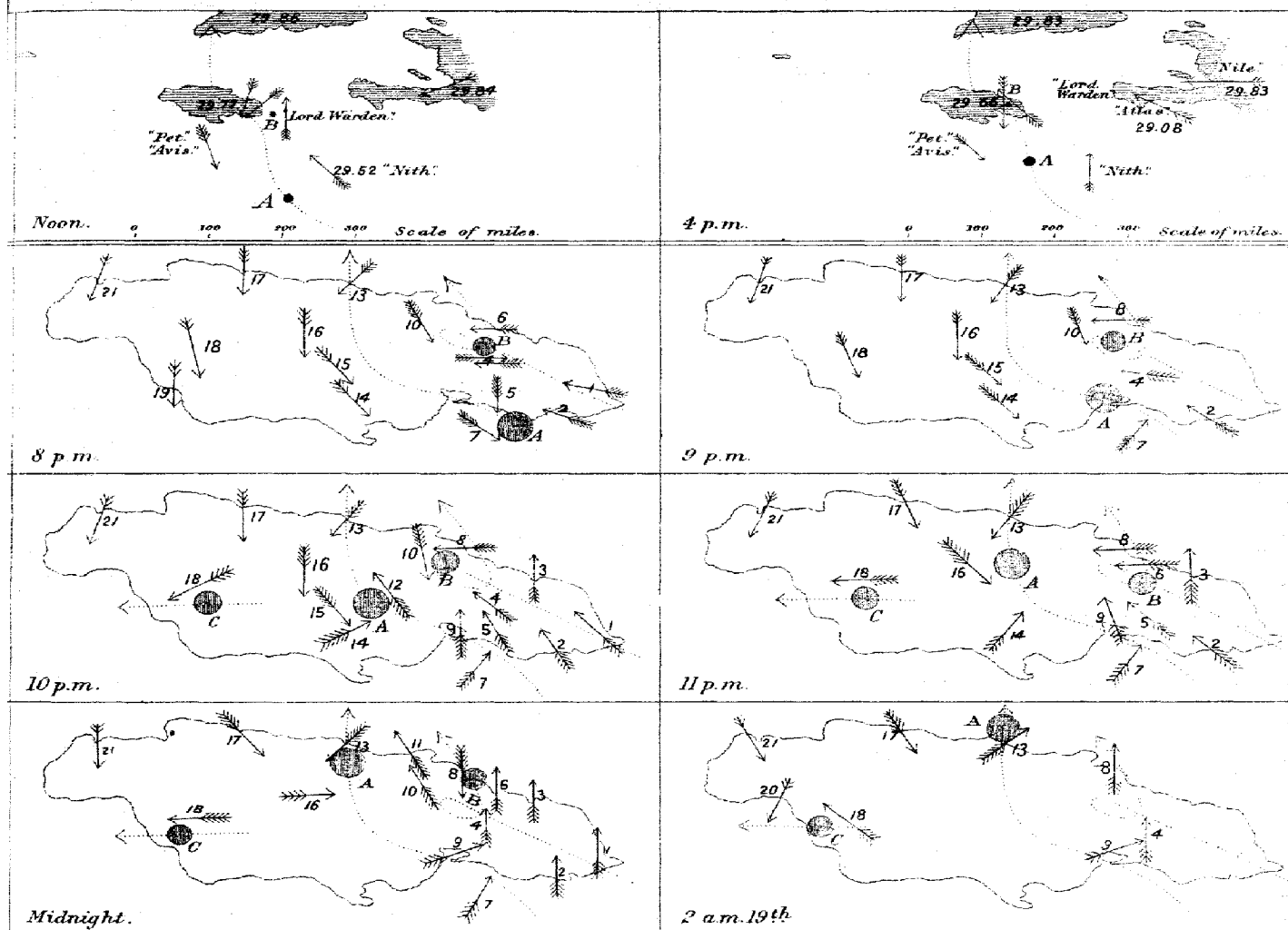
At Kingston there was no wind! The winds from the two Cyclones counteracted each other; and although the bar. fell rapidly after 4 p.m. there were only a few flaws of wind from N.W. and an upper cloud-drift from N.E., the flaws being due to Cyclone B, the drift to the larger Cyclone A.

The observations made at Kingston will be found in note 7; the progressive movement of Cyclone A had been correctly deduced up to about noon on the 18th; but as the pressure only fell one-tenth of an inch between 7 a.m. and 3 p.m., it was supposed that the Cyclone was continuing its course, and that the western part of the Island, rather than Kingston, was threatened, and in consequence only a cautionary notice was posted in Kingston; and indeed, with all the facts before us now, it is difficult to understand why the Kingston bar. did not fall more at 3 p.m. beneath the combined effect of the Cyclone B, which was close at hand, and the Cyclone A, which had turned on its course and was moving towards Kingston.

One part of the explanation will be found in the fact that the fall of the bar. due to Cyclone B was really very small up to 9 or 10 p.m. At Newcastle and at the Cinchona Plantation there were fairly good mercurial barometers; and it is remarkable how little the bar. fell at these places although the centre must have passed very near them, and it is equally remarkable how violent the westerly wind was at Newcastle between 7 and 8 p.m.

The other part of the explanation may be due to an abnormal pressure, caused by the accumulation of air between the two centres; as already said, the winds round the two centres counteracted each

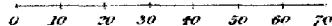
CYCLONES, AUG. 18, 1880.



Places.

1. Hordley.
2. Morant Bay.
3. Port Antonio.
4. Newcastle.
5. Halberstadt.
6. Spring Garden.
7. S. S. Alps.
8. Prospect.
9. Kingston.
10. Pear-tree Grove.
11. Salt Out.
12. Linstead.
13. St. Ann's Bay.
14. May Pen.
15. Chapellton.
16. Clarksonville.
17. Falmouth.
18. Appleton.
19. Black River.
20. Savan-la-mar.
21. Lucea.

Scale of Miles.



The arrows fly with the wind, and the number of feathers refer to

Beaufort's Scale.

	Miles per hr.
2. Light breeze	13
4. Moderate	23
6. Strong	34
8. Fresh gale	48
10. Whole	65
12. Hurricane	90

The small circles represent the calm centres of the Cyclones.

other, and if an undue amount of air were piled up in consequence, of course there would be a slight increase of pressure; and moreover such increase of pressure would tend to keep the centres apart. It will be noticed in the engraving how carefully the Cyclone B avoided the Cyclone A; and that they did not rush together and combine is apparently due to this small ridge of pressure between them; we may at least accept this explanation in order to make the narrative intelligible.

8 AND 9 P.M.

At 8 p.m. the Cyclone A was about 20 miles S.E. of Kingston, and the wind was violent at Morant Bay and on board the S.S. "Alps" which had left Kingston at 5 p.m. and which now encountered the full force of this Cyclone.

The Cyclone B seems to have remained almost stationary, entangled as it were among the lofty ranges of the Blue Mountains. At 7.30 p.m. the wind at Newcastle was from W. and violent; but about 8 p.m. it changed to E. or E.N.E.; and both these directions have been marked in the map to show how Newcastle was affected by the wind from the two centres. At 9 p.m. the Centre B was on the northern side of the Blue Mountain range, and Newcastle was then exposed to only the easterly winds from Cyclone A; and the full force of B was felt at Pear Tree Grove. At this hour the calm centre of A was over Kingston, when the lowest barometer occurred.

10 AND 11 P.M.

After the calm centre of A had passed over Kingston the town was exposed to the full force of the wind from the S., but as the centre was moving rapidly, the gale lasted for only one hour. Cyclone B was still almost stationary, having moved but little towards the N.W.; and it will be noticed how Cyclone A swerved on its course from its position at 4 p.m. in order to move round B.

But now another Cyclone, C, made its appearance in the S.W. of Jamaica; and between 10 and 11 p.m. Cyclone A swerved again to avoid Cyclone C!

This turn, the two turns, or the high mountain range called Mount Diabolo, or all combined, seems to have been almost too much for Cyclone A, which had to stop on its course, or nearly so, to recover strength, as it were, before it got out again to sea at 2 a.m., when it moved rapidly away.

Nearly all we know about Cyclone C is due to Mr. William Hill of Appleton (see Note 18); it was apparently a minor Cyclone, and got out to sea without doing much damage; it was however encountered by the brigantine "Jura," which was driven from Negril Point, at the extreme west end of Jamaica, a long way to westward (see Note 22).

MIDNIGHT AND 2 A.M.

The proceedings of Cyclone B still remain for consideration. As already said, Cyclone A moved very slowly on its course between 10 p.m. and 2 a.m.; and if B had continued on its own slow course, A and B would have met about midnight at St. Ann's Bay; but apparently to avoid the encounter, B began to retrace its course; and the bar at Newcastle, which was rising about 10 p.m., had fallen again at 11 p.m.; Prospect in St. Mary, and Spring Garden in Portland now had their share of this night's proceedings; and it was not until midnight that Cyclone B got out to sea, producing a hurricane from the N. at Prospect and from the S. at Spring Garden. (See Notes 15 and 16).

Cyclone B must have moved N.W. so that the wind at Prospect was S. after 1.30 a.m.

It will be noticed that Cyclone B passed over Spring Garden between 11 p.m. and midnight; the lull occurred between 11 and 11.30; but the lowest bar. (28.93) did not occur until midnight. This low reading and the delay in the time of lowest reading shows that Cyclone B was developing; and it would have been very interesting to have followed the movements of the two Cyclones, A and B; but all that we know is that the "storm" soon reached Manzanilla in Cuba, crossed Cuba, and produced stormy weather off the American coast.

MAXWELL HALL.

London, Jan. 4th 1889.

NOTES.

(1.) WEATHER AT THE WINDWARD ISLANDS, AUGUST 16TH.

(St. Thomas Tidende, August 18th, 1880.)

	10 a.m.	4 p.m.
Antigua	... High winds	... N.E. cloudy, 30.5 rising.
St. Kitts	... do.	... E. clearing.
Guadaloupe	... Heavy rains, light gale	... E. rainy.
Dominica	... Rainy, squally	... S.
Martinique	... Rainy, 29.70	... Rainy, 29.67, N.E. light.
St. Lucia	... Rainy, squally	... Rainy, S. light.

(2.) EXTRACTS FROM LOG OF S.S. "NITH"—Captain Morrell, August 15th. At noon S. point of Guadaloupe bore N. about 3 miles. Wind fresh from N.E., gradually increasing, with hard squalls.

August 16th, 8 a.m. Wind E., backing at times to N.E., strong; overcast sky. Noon, less wind; sea running high; lat. $16^{\circ} 4' N.$, long. $65^{\circ} 55'$; distance run 245 knots; course W. magn.

August 17th. Hard gale, heavy squalls, and torrents of rain in the morning. Wind then moderated, and veered from N.E. to S.E. as far as S. Noon, barometer 29.72 (corrected); lat. $16^{\circ} 10' N.$; long. $70^{\circ} 26' W.$; distance run 260 knots; course W. magn. Towards sunset the weather abated a little, but at 9 p.m. it came on again with renewed force.

August 18th, commenced with terrific squalls from E. to S.E., with torrents of rain and incessant thunder and lightning. Towards noon the storm increased in violence; the vessel was rounded to with her head to S. Noon, barometer 29.52 (corrected); lat. $16^{\circ} 27' N.$; long. $74^{\circ} 57' W.$; distance run 260 knots. At 4 p.m. the wind veered to the south-ward and moderated; the barometer rose. At 8 p.m. the vessel was put on her course again, and at midnight the weather was comparatively fine.

August 19th. Early in the morning wind S. and S.S.W. At 8 a.m. the ship's head was put northward; at 1 p.m. Jamaica was sighted off the starboard bow; and at 4 p.m. the vessel was off Plumb Point Light-house.

(2.) SCHOONER "LORD WARDEN."—J. S. Legoe, master, August 17th, 6 p.m. Left Port Morant for Long Island, Bahamas; wind N. strong.

August 18th, 4 a.m. Wind N.E., increasing; course E.S.E.; heavy sea; rain, 10 a.m., terrific squalls from S.E.; hove the vessel to; heavy sea; rain. Noon, about 25 miles off Morant Point Light-house; wind S., very strong; rain, headed S.W. 4 p.m., weather moderating; rain. 8 p.m. weather cleared.

August 19th, 4 a.m. Made all sail and stood to N.E.; all quiet after sunrise.

(4.) PEDRO BANK, SCHOONER "PET".—Lawrence, master, August 18th. At Portland Cays; wind strong all morning from N.E.; about noon shifted to N.N.W.; at 9 p.m. wind very strong; chain parted, and the schooner was driven over one reef of rocks into deep water again.

August 19th, at daylight wind S.S.W., fine.

SCHOONER "AVIS".—(Communicated by Lieut. Carpenter, R.N.) August 18th. At S.W. Dangerous Breaker; at 8 p.m. wind N.W. by W.; at midnight, W. by N. August 19th, 4 a.m., wind W., followed by S.W. light.

(5.) MANCHIONEAL.—(*Colonial Standard*, August 23th, 1880.) "On Wednesday morning the 18th, the wind blew in freshly from N.E., and continued so until 3 p.m., when it increased in strength until 6 p.m., and the schooner "Village Bride" went ashore. The wind changed to S.E. and blew with such fury that it carried almost every thing before it. The sea at the same time rushing on the land swept away houses and shops. This magnificent and awful war of nature continued about four hours, after which the wind lulled, and was succeeded by torrents of rain".

(6.) PORT ANTONIO. Extract from log of S. S. "Tropic," Capt. R. W. King.

	Bar. uncor.	Weather.
	in.	
6 a.m.	30.0	E., fresh, threatening.
11 "	29.9	...
12 noon	29.8	...
1 p.m.	29.4	...
2 "	29.0	Heavy rains.
2.30 "	28.9	Wind veering S.
4 "	28.6	S.E., heavy gale.
11 "	28.4	S., heavy gale; lowest bar.

The heaviest wind was from S. and lasted an hour; at midnight the bar. was rising rapidly.

(7.) KINGSTON.—Mr. Maxwell Hall, August 17th. The barometer fell slowly all day, but there was no wind to indicate the direction of the disturbance. Towards sunset however the clouds began to move from the N.E. showing that the disturbance lay to the S.E. of Jamaica. At 7 p.m. the sky was about half covered with cirro-stratus, flushed by the rays of the sun already set; and among these glowing clouds the moon shone with a pale blue light. The barometer fell slowly during that night and at 7 a.m. on the 18th the weather was described as "threatening" in the usual telegram to Washington. At 3 p.m. a cautionary notice was posted at the Commercial Exchange; at 5 p.m. the offices were closed as usual in the town, and there were no means of announcing more immediate danger.

The barometer now began to fall with great rapidity; as yet there was no wind; the sky was overcast, the clouds moving slowly from the E.N.E.; and it was not until 8hr. 15min. p.m., an hour before the lowest reading, that the wind commenced from E.N.E., drifting the rain, which had quietly fallen for some time.

Between 8hr. 15min. and 8hr. 30min. the barometer fell 0.112in.; this was the highest rate of fall; and assuming that the centre was approaching at the rate of 18 miles an hour, we have the very steep gradient of 0.025in. per mile.

The wind now began to freshen a little, and after the barometer fell to its lowest, 28.917 at 9hr. 15min., the wind shifted round by E. to S., and blew a gale during the first rise of the barometer. At 10hr. 15min. the gale increased in violence from S., and its extreme velocity was estimated at 80 miles an hour.

The wind now shifted to the S.S.W., moderated, and at midnight the storm had fairly passed Kingston.

The temperature of the air was 76° at 8 p.m.; 77° at midnight; 79° at 1 a.m.; 80° at 2 and 3 a.m.; after which it fell to 78° at 6 a.m. on the 19th.

The following observations were made at Parke Lodge, Kingston:—

Day.	Hour.	BAROMETER.		WIND.		Remarks.
		Cor. 32° Sea-level.	Cor. for Diurnal Var.	Dirac. from	Miles Pr. Hr.	
		In.	In.			
16	7 a.m.	29.967	29.953	E.	3	Light squalls with rain during the day* fine night
	3 p.m.	.953	.991	W.	1	
	11 "	.991	.966	Z.	0	
17	7 a.m.	.958	.944	Z.	0	Close and warm during the day and night; night cloudy; drift from N.E.
	3 p.m.	.884	.922	S.	1	
	11 "	.910	.885	Z.	0	
18	7 a.m.	.859	.845	Z.	0	Close and cloudy during the morning and afternoon, with a few heavy showers. Clouds still from N.E.
	8 "	...	...	...	...
	9 "	...	...	...	...
	10 "	.820	.788	...	...
	11 "	.809	.775	...	...
	noon.	.785	.766	...	...
	1 p.m.	...	...	N.N.W.	1	
	2 "	.714	.738	Z.	0	
	3 "	.691	.729	N.N.W.	2	
	4 "	...	...	...	...
	5 "	.618	.660	Z.	0	
	6 "	.543	.577	W.N.W.	2	
	6.30 "	.520	.547	...	...
	7 "	.472	.491	...	...
	7.30 "	.375	.385	N.W.	...	
	8 "	.272	.272	...	...	Overcast, clouds from E.N.E.; light rain at first, then heavy.
	8.15 "	.202	.199	E.N.E.	5	
	8.30 "	.094	29.087	...	...
	8.45 "	29.001	28.990	N.	...	
	9 "	28.951	28.937	N.E.	10	
	9.15 "	28.933	28.917	E.	10	
	9.30 "	28.992	28.974	S.E.	15	Scud; wind, rain, clouds all from S.E.
	9.45 "	29.034	29.014	S. by E.	20	
	10 "	.081	.059	S.	60	
	10.15 "	.188	.166	...	80	
	10.30 "	.262	.239	...	60	
	10.45 "	.330	.306	S.S.W.	70	
	11 "	.400	.375	...	...
	11.15 "	.477	.452	...	50	
	11.30 "	.529	.505	W.S.W.	20	
	11.45 "	.665	.642	...	...
19	12 "	.581	.559	...	...	Rain light. Rain stopped. Clearing.
	1 a.m.	.629	.617	...	15	
	2 "	.651	.656	...	...
	3 "	.681	.699	...	10	
	4 "	.721	.743	...	5	
	5 "	...	...	...	...
	6 "	.775	.783	S.W.	3	
	7 "	.816	.802	S.	3	
	3 p.m.	29.845	29.883	Z.	0	

(8.) THE CINCHONA PLANTATION is 4,907 feet above the level of the sea, and it is upon the southern slope of the Blue Mountain range; Mr. D. Morris, the Director of Public Gardens and Plantations, wrote us follows:—"During August 17th we had a high wind and a fall of 2.44 inches of rain. This continued to the morning of the 18th, when the rain became heavy and continuous, with strong gusts from the N. and N.W. At 3.30 p.m. barometer 25.11, uncorrected. At 4 p.m. the wind became higher and swept with heavy sheets of rain from the N.E. At 4.30 p.m. bar. 25.00 uncor. temperature 65°. By 7 p.m. the wind had increased to a gale, and pebbles, branches of trees, and various debris, were blown about, some striking the windows and doors with considerable force. The bar. continued to fall, and at 7.15 p.m. registered 24.80; temp 60°. Soon after 8 p.m. a momentary lull took place, which was followed by a terrific gale; the stable and some out-buildings near the residence were blown down and the boards were carried in a stream of wreckage down a ravine for some hundred yards; soon afterwards the Superintendent's office and the roofs of the propagating houses succumbed; and a large limb of a juniper tree growing on a slope facing E. was carried over the crest of the hill, through two fences, and was landed with great force against the back verandah of the residence: the verandah was broken and the doors and windows forced in.* About 11 p.m. the gale moderated, but shortly after blew with increased force from E. and S.E. It was nearly 3 a.m. on the 19th before an appreciable lull took place, and this was succeeded by heavy downpours till nearly daylight. The rainfall during the 19th† was twenty inches."

(9.) NEWCASTLE, the garrison of the white troops quartered in Jamaica, is about 4,000 ft. above the level of the sea; it is sheltered from the N.E., N. and N.W. by mountains which culminate in St. Catherine's Peak about 5,000 ft. above the sea. A most graphic account of the storms was given in *The Budget*, August 26th, 1880; but the confusion of the winds caused by the two centres, by the mountains, and by the mountain gaps, is so great that it will be better to give a summary of the account:—

* And the mercurial bar. was broken.

† During the storm on the 18th and 19th.

Bar. cor. 32°. Wind.

3	p.m.	26.123	?	
4	"	26.023	N.	Heavy rain.
5	"	25.973	W.	
6	"	.900	N.	Rain in torrents,
7.30	"	.713	W.	Wind violent; houses blown away.
8	"	.673	?	" " "
9	"	.563	E.N.E.	" " "
9.30	"	.513	E.	" " "
10.15	"	.850	S.E.	" " "
10.45	"	.906		
11 15	"	.800		
11.25	"	25.808	S.	

(10.) S.S. ALPS, Captain Krause.

Comparison of Barometers.

	<i>Alps aneroid.</i>	<i>Kingston standard.</i>	<i>Diff.</i>
August 18th, 8 a.m.	30.12	29.85	0.27
noon	30.05	29.78	0.27
2.30 p.m.	30.02	29.70	0.32
4 p.m.	30.00	29.66	0.34

Whence it appears that 0.30 should be subtracted from the readings of the aneroid, and this correction has been applied in the following notes:—

Extract from Log.

August 18th, 4.50	p.m.	Left wharf.
6.15	"	Off Plumb Point; 29.30
6.30	"	Blowing a hurricane, N.W.
8.0	"	" " N.W.; 28.86
8.30	"	Calm for 20 min.
8.50	"	Bar. rising, wind W.S.W.
9.0	"	Hurricane, S.W.; full strength.
11.0	"	Hard gale, S.W.; 29.56
12.0	mt.	Strong gale, S.S.W.; 29.60
August 19th, 4.0	a.m.	29.70
6.0	"	29.78
8.0	"	Clearing; in sight of Morant Point Light House.

(11.) HALBERSTADT, St. Andrew—Hon. Stephen Mais. Lat. 17° 59'; Long. 76° 39'; Elevation 2,400 ft.

Wind.

August 18th.	From 8 p.m. to 9.30 p.m.	N. Strong gale.
	9.30 to 12 p.m.	S.E. do.
	12 to 3 a.m.	S. Moderating.

The wind veered from the N. to the S.E. in about five minutes; it did great damage to all the buildings, and blew down a large number of trees.

(12.) IVER, St. Andrews.—Miss Newton. About 6 miles N.N.E. of Kingston. Elevation 1,650 ft.

August.	Hour.	Aneroid corrected and reduced.	Wind.	Bar. at Kingston.	Diff.
	h. m.	in.		in.	
18	4 0 p.m.	29.66	N.N.E.	29.66	0.00
	6 35 "	29.50	"	.51	.01
	6 50 "	29.41	"	.49	.08
	7 10 "	29.31	N.	.46	.15
	7 25 "	29.26	"	.40	.14
	7 40 "	29.18	"	.32	.14
	8 5 "	29.06	N.E.	.25	.19
	8 40 "	28.81	S.S.E.	29.03	.22
	9 15 "	28.81	"	28.93	.12
	9 40 "	28.91	"	29.02	.11
	10 55 "	28.92	"	.38	.46
	11 20 "	29.21	"	.49	.28
19	0 0 mt.	29.31	"	.58	.27
	0 35 a.m.	29.44	"	.61	.17
	2 45 "	29.47	E.	.67	.20
	5 20 "	29.66	N.E.	29.76	0.10

The Aneroid was compared with the Kingston standard, Jan. 28th, 1881, with the following results:

9.30 a.m.	add to Aneroid	in. 0.008
10.30 "	subtr. from "	0.037
4.20 p.m.	" " "	0.066

Consequently the correction and reduction employed above were found by simply making the Iver reading at 4 p.m. agree with that at Kingston.

(13.) CLARKSONVILLE, St. Ann.—Rev. J. M. Denniston. Latitude $18^{\circ} 16'$; Long. $77^{\circ} 22'$. Elevation 1,950 feet.

Time.		Barometer.		Wind.	
		Unreduced.	Reduced.	—	
	h. m.	in.	in.		
18th	4 0 p.m.	29.54	29.82	N. by E.	Light: fresh at 6.
	7 15 "	.45	.73	N. by E.	Strong.
	8 30 "	.38	.66	N.	"
	9 0 "	.36	.64	N.	"
	9 30 "	.30	.58	N.	"
	10 0 "	.23	.51	N.	Gale.
	10 20 "	.21	.49	N. by W.	"
	10 35 "	.17	.45	N.N.W.	"
	11 0 "	.15	.43	N.W.	"
	11 15 "	.12	.40	N.W.	Strong gale.
	11 40 "	.12	.40	W.N.W.	"
19th	0 15 a.m.	.14	.42	W.	Gale.
	0 45 "	.20	.48	W.S.W.	Strong.
	1 30 "	.29	.57	S.W.	Moderating.
	2 0 "	.29	.57	S.	"
	2 30 "	.34	.62	Calm	Calm.
	4 0 "	.40	.68	...	
	5 30 "	.50	.78	...	
	8 15 "	.58	.86	...	
	2 35 p.m.	.57	.85	...	
	3 45 "	.56	.84	...	
20th	10 0 a.m.	29.67	29.95	S.E.	

The wind veered from the N. back to the W. without any lull. It was strongest from the N.W. from about 11 to 12 p.m.

The house was damaged and trees were blown down.

* Rain fell incessantly from about 6 p.m. to about 1.30 a.m. on the morning of the 19th.

COMPARISON OF BAROMETER (ANEROID)

1880.		Kingston standard, corrected and reduced.	Barometer un- reduced.	Correction. +
		in.	in.	in.
August 31st	7 a.m.	29.941	29.665	0.276
	3 p.m.	.930	.665	.265
	11 p.m.	.993	.70	.293
September 1st	7 a.m.	.960	.67	.290
	3 p.m.	.914	.65	.264
	11 p.m.	.993	.70	.293
September 2nd	7 a.m.	.957	.68	.277
	3 p.m.	.907	.63	.277
	11 p.m.	29.982	29.69	0.292
				0.281

Hence we must add 0.28 to the readings of the Clarksonville Aneroid in order to correct it and reduce it to the sea-level.

(14.) SEVILLE, St. Ann.—Mr. H. P. Thompson. Latitude $18^{\circ} 28'$; Longitude $77^{\circ} 14'$; Elevation 150 feet.

August.	Hour.	Barometer.		Wind.	Remarks.
		Unreduced.	Reduced.		
	h. m.	In.	In.		
18	9 0 a.m.	29.80	29.92	E. fresh	Temperature 83° , maximum for day. Rain fell in torrents until 3 a.m., except during calm. Temperature 72° . Sudden calm for 30 or 40 minutes.
	3 0 p.m.	.63	.74	E. strong	
	6 0 "	.56	.67	N.E. gale	
	9 0 "	.40	.54	N.E. strong gale	
19	11 30 "	29.03	29.17	N.E. violent	
	0 15 a.m.	28.72	28.86	N.E. calm	
	0 40 "	28.69	28.83	S.W. violent	
	1 30 "	28.98	29.12	calm	
	6 0 "	29.63	29.77		

Great damage was done to some of the houses and buildings, such as stables, &c.; a large number of cocoanut trees, &c., were blown down.

The following comparisons of the mercurial barometer with that at Kingston were made.

September.	Hour.	Kingston corrected and reduced.	Seville Barometer.	Attached Thermometer.	Remarks.
5	7 a.m.	In. 29.987	In. 29.87	80°	Temp. 80° add
	3 p.m.	29.977	.86	84	0.12 in.
	11 "	30.071	.95	81	to Seville Bar.
6	7 a.m.	30.035	.91	81	Temp. 70° add
	3 p.m.	29.981	.90	84	0.15
	11 "	30.042	29.94	81	to Seville Bar.

Corrections based on these data were applied in the table above.

(15.) SPRING GARDEN, Portland.—Mr. W. B. Esquent. Lat. 18° 15'; Long. 76° 38'; Elevation 125 ft.

Aug.	Hour.	Barometer.		Wind, Weather, &c.
		Unreduced.	Reduced.	
18	9 a.m.	in. 29.65	in. 29.68	S.E., fresh.
	12 noon	29.60	29.63	N. by E., strong.
	5 p.m.	29.50	29.53	E., gale increasing from 5.30
	11 "	29.30	29.33	to 11; lull from 11 to 11.30.
	12 mt.	28.90	28.93	S., strong gale.
19	12 noon	29.80	29.83	Calm.

The wind was E. at 11 p.m. before the lull; the bar. was lowest at midnight, half an hour afterwards it began to rise. The wind was strongest from the S. at midnight; it greatly damaged the buildings, and blew down or broke in two the cocoanut trees, &c. The Rainfall between 9 a.m. 18th and 9 a.m. 19th was 6.50 inches.

(16.) PROSPECT, St. Mary.—Hon. H. Westmoreland. Lat. 18° 20'; Long. 76° 50'; Elevation 500 ft.

August 18th,	9	hr. p.m.	E. $\frac{1}{2}$ S., gale
"	10	"	" "
"	11	"	" " increasing
"	12	midnt.	N., very strong gale
19th	1	a.m.	" "
"	1.30	"	S., strong gale
"	2	"	" moderating
"	3	"	" do.

The chief damage was done between 12 and 1.30 a.m., when the wind was strongest and from the N.

(17.) BELMONT, St. Ann. Captain Cartwright.—Lat 18° 26'; Long. 77° 8'. Elevation 370 feet.

During the early part of August 18th there were squalls from the N.E.; between 5 and 6 p.m. the squalls almost ceased, and then the storm commenced.

Wind.

August 18th, 6	p.m.	N.E.	Freshening.
8	"	N.E.	Gale.
10	"	N.E.	Strong gale.
11.30	"	N.E.	Moderating.
August 19th, 0.30	a.m.	Z.	Calm.
1	"	W.S.W.	Freshening.
2	"	W.S.W.	Strong gale with lightning.
3	"	W.S.W.	Abating

The calm lasted about half an hour; the wind was strongest from the W.S.W.; but in consequence of exposure the wind from the N.E. did more damage to buildings, trees, &c. Rain fell almost incessantly from 9 p.m. to 3 a.m.

(18.) APPLETON, St. Elizabeth. Mr. William Hill.—Lat. 18° 11'; Long. 77° 44'. Elevation 500 feet.

<i>Hour.</i>	<i>Wind.</i>
August 18th, 8 p.m.	N. by W. Fresh.
9 "	N. by W. Gale.
10 "	N.E. Gale increasing.
11 "	E. Strong gale.
12 mnt.	E. Very strong gale.
August 19th, 1 a.m.	E.S.E. Strong gale.
2 "	S.E. Gale.
3 "	S.S.E. Moderating.

The wind was strongest at midnight. Trees were blown down, but otherwise no damage was done.

(19.) BLACK RIVER. Mr. C. M. Farquharson,—from information received.

August 18th, noon. W. light, clear, sea high.

" 4 p.m. N. to N.W., cloudy.

" 7 " " foggy.

" 8 " N. very strong: clouds flying from N., light rain.

(20.) SAVANNA-LA-MAR. Mr. J. M. Farquharson, jr.

August 18th. From S. the wind backed to the N.E. and N., which was never very strong during the night.

(21.) FROME, Westmoreland. Hon. W. Vickers.

During the afternoon, August 18th, there was a light wind from S.S.W.; about 11 p.m. there was a very strong squall from N.N.E. which lasted about 15 min. and continued squally until daylight, when it cleared up. There were a few showers of rain, 0.45 in. in the 24 hours. No damage done.

(22.) LUCCA, Mr. J. G. Doorly.

" On the night of the 18th, the wind blew from a little to the N. of E. until 2 or 3 a.m. 19th, when it veered to the N.W.

Wm. Long, master of the Brig. "Jura," reports that when about 8 miles from Negril Point, he encountered a storm which drove him a long distance to the westward.

The master of a Caymanas Schooner reports that the storm was very severe among those Islands."

(23.) GRAND CAYMAN ISLAND. Mr. W. B. Webster.—(Extract from Letter dated December 8th, 1881.)

"There was so little disturbance of the weather observed at the time when the Cyclone swept over Jamaica, I cannot hear of any observation having been taken at all trustworthy.....I have done my best to obtain for you the information you ask, but find nothing likely to be of any service."

M. H., 4.1.89.